MarLIN

Marine Information Network

Information on the species and habitats around the coasts and sea of the British Isles

A brachiopod (*Novocrania anomala*)

MarLIN – Marine Life Information Network
Biology and Sensitivity Key Information Review

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A report from:
The Marine Life Information Network, Marine Biological Association of the United Kingdom.

Please note. This MarESA report is a dated version of the online review. Please refer to the website for the most up-to-date version [https://www.marlin.ac.uk/species/detail/1331]. All terms and the MarESA methodology are outlined on the website (https://www.marlin.ac.uk)

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See online review for distribution map

Distribution data supplied by the Ocean Biogeographic Information System (OBIS). To interrogate UK data visit the NBN Atlas.

Researched by	Angus Jackson	**Refereed by**	This information is not refereed.
Authority	(O. F. Müller, 1776)		
Other common names	-	**Synonyms**	*Crania anomala* (Müller, 1776), *Neocrania anomala* (Müller, 1776)

Summary

Description

Brachiopods are bivalved animals unrelated to molluscs. *Novocrania anomala* looks rather like a limpet with a low conical shell or valve attached to a hard surface. The shell is oval in vertical view and up to 1.5 cm long. The other valve is cemented to the surface beneath the animal. The shell surface is smooth and has fine concentric lines. Shell colour is pale grey, yellow or white and is overlaid with a thin brown periostracum.

Recorded distribution in Britain and Ireland

From the Firth of Clyde up the west coast of Scotland including the Hebrides, Shetland, the south coast of England and the Isle of Man. In Ireland along the south coast, the north-west and the north-east.

Global distribution

From the Canary Isles, the Britain Isles, the Faeroe Isles, Norway, Iceland and Spitzbergen.

Habitat

Typically inhabits rocky current-swept bottoms in moderately shallow water. The species is not very tolerant of wave exposure and so is found in deep water or in sheltered fjordic sea lochs.

Depth range

15-1500

Identifying features

- Ventral valve is cemented to substratum.
- Dorsal valve conical with the apex posterior to the midpoint.
- Valves lack articulation.
- There is no pedicle.
- Calcium carbonate based shell.

Additional information

Unusually for the inarticulate brachiopods, the shell contains calcium carbonate. In brachiopods the valves of the shell are dorso-ventral whereas in molluscs the valves are lateral.

Listed by

Further information sources

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Biology review

Taxonomy

Phylum	Brachiopoda	Lamp shells
Class	Craniata	
Order	Craniida	
Family	Craniidae	
Genus	Novocrania	
Authority	(O. F. Müller, 1776)	
Recent Synonyms	Crania anomala (Müller, 1776)	Neocrania anomala (Müller, 1776)

Biology

Typical abundance	Moderate density
Male size range	0.23 - 15mm
Male size at maturity	
Female size range	Small(1-2cm)
Female size at maturity	
Growth form	Bivalved
Growth rate	Data deficient
Body flexibility	No information
Mobility	Sessile
Characteristic feeding method	Active suspension feeder
Diet/food source	Planktotroph
Typically feeds on	seston
Sociability	No information
Environmental position	Epifaunal
Dependency	No information found.
Supports	No information found
Is the species harmful?	No No text entered

Biology information

The lophophore forms the main feeding organ. Mucus is not used in particle capture, only for transport. *Novocrania anomala* exhibits some degree of particle selectivity. There is a complex mechanism for particle rejection. There is little information on growth rate except that it is believed to be represented by an exponentially declining curve but dependent on depth, food, population density etc. Growth after the first year is slow. Four or five year classes can be identified. *Novocrania anomala* is capable of recovery from considerable damage to the shell and soft tissue. The adults can be maintained quite well in aquaria and are generally hardy organisms.

Habitat preferences

Physiographic preferences	Open coast, Offshore seabed, Sea loch / Sea lough, Open coast, Offshore seabed, Sea loch / Sea lough

Biological zone preferences	Lower circalittoral, Lower infralittoral, Upper circalittoral, Lower circalittoral, Lower infralittoral, Upper circalittoral
Substratum / habitat preferences	Bedrock, Large to very large boulders, Other species, Small boulders, Bedrock, Large to very large boulders, Other species, Small boulders
Tidal strength preferences	Moderately Strong 1 to 3 knots (0.5-1.5 m/sec.), Very Weak (negligible), Weak < 1 knot (<0.5 m/sec.), Moderately Strong 1 to 3 knots (0.5-1.5 m/sec.), Very Weak (negligible), Weak < 1 knot (<0.5 m/sec.)
Wave exposure preferences	Extremely sheltered, Moderately exposed, Sheltered, Ultra sheltered, Very sheltered, Extremely sheltered, Moderately exposed, Sheltered, Ultra sheltered, Very sheltered
Salinity preferences	Full (30-40 psu), Full (30-40 psu)
Depth range	15-1500
Other preferences	No text entered
Migration Pattern	Non-migratory / resident

Habitat Information

Absent from the Irish Sea and from the east coast of Britain. Can often be found living on *Modiolus* sp. or empty scallop shells.

Life history

Adult characteristics

Reproductive type	Gonochoristic (dioecious)
Reproductive frequency	Annual protracted
Fecundity (number of eggs)	No information
Generation time	Insufficient information
Age at maturity	Data deficient.
Season	April - November
Life span	5-10 years

Larval characteristics

Larval/propagule type	-
Larval/juvenile development	Lecithotrophic
Duration of larval stage	2-10 days
Larval dispersal potential	100 -1000 m
Larval settlement period	Insufficient information

Life history information

Longevity is suspected to be between 8-10 years. There is no obvious sexual dimorphism although the colour of the gonads may be distinguishing. Testes are light coloured white, pink, cream or blue

and ovaries are orange-brown. Egg diameter is 120-125 microns. The species is free-spawning and fertilisation is external in the surrounding water column. The eggs are more dense than seawater and hatch into a free-swimming larval stage. The larvae are fully developed within three days and settle out in no more than a few days. Most of the literature suggests that dispersal ability is not great. Although the species may inhabit areas with water flow rates of up to 3 knots, the often restricted and sheltered habitat such as sea lochs may reduce dispersal ability. The breeding season in western Scotland has been inferred from the presence of recently settled juveniles. The larva may be able to delay settlement if the initial substratum is unsuitable or the water is too deep.

Sensitivity review

This MarLIN sensitivity assessment has been superseded by the MarESA approach to sensitivity assessment. MarLIN assessments used an approach that has now been modified to reflect the most recent conservation imperatives and terminology and are due to be updated by 2016/17.

Physical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Substratum Loss	High	Moderate	Moderate	Low

The adults are permanently cemented to the substratum so substratum loss would result in the death of the population. Adults are permanently attached to the substratum so no adult immigration is possible. No information is available about fecundity. Dispersal ability is not considered to be that great although in many locations there are nearby populations (particularly the west coast of Scotland). Reproduction occurs annually and over an extended period of time.

Smothering	High	Moderate	Moderate	Moderate

The dorsal valve of the shell can be clamped down and low oxygen concentrations can be tolerated for a few days. However smothering by sediment for a month will prevent feeding and restrict oxygen concentrations for considerably longer and will probably cause death. Adults are permanently attached to the substratum so no adult immigration is possible. No information is available about fecundity. Dispersal ability is not considered to be that great although in many locations there are nearby populations (particularly the west coast of Scotland). Reproduction occurs annually and over an extended period of time.

Increase in suspended sediment	Low	Very high	Very Low	Moderate

Neocrania anomala has a complex mechanism for removing unwanted particulate material brought in with the inhalant water current. Increases in siltation rate will result in a more regular requirement for this material to be removed. This will have an energetic cost and interfere with feeding. On removal of the factor it may take some time for the animals to regain condition.

Decrease in suspended sediment

Dessication	Not relevant	Not relevant	Not relevant	Moderate

The species tends to be attached to hard substrata at depths of at least 15 metres. It is extremely unlikely that the population would be exposed to desiccation.

Increase in emergence regime	Not relevant	Not relevant	Not relevant	Moderate

The species tends to be attached to hard substrata at depths of at least 15 metres. It is extremely unlikely that the population would be exposed to an emergence regime.

Decrease in emergence regime

Increase in water flow rate	High	Moderate	Moderate	Moderate

The species is found in waters with a maximum velocity of 2-3 knots. Increases above this level would probably cause death. Decreases in water flow rate are unlikely to have any effect as feeding currents are generated by the animal itself. Adults are permanently attached to the

substratum so no adult immigration is possible. No information is available about fecundity. Dispersal ability is not considered to be that great although in many locations there are nearby populations (particularly the west coast of Scotland). Reproduction occurs annually and over an extended period of time.

Decrease in water flow rate

Increase in temperature Intermediate High Low

The geographic distribution of *Neocrania anomala* extends to the north and south of the British Isles and so is exposed to higher and lower water temperatures. Small, long term changes in temperature are unlikely to have much effect. Short acute changes, particularly increases may cause death. Adults are permanently attached to the substratum so no adult immigration to supplement the population is possible. No information is available about fecundity. Dispersal ability is not considered to be that great although in many locations there are nearby populations (particularly the west coast of Scotland). The species may live for up to ten years. Reproduction occurs annually and over an extended period of time.

Decrease in temperature

Increase in turbidity Tolerant Not relevant Not sensitive Low

The species has no reliance on light availability. It is found at up to 1500 metres in depth where light availability is virtually nil. Changes in light transmission and attenuation are unlikely to affect this species.

Decrease in turbidity

Increase in wave exposure High Moderate Moderate Moderate

This species is not very tolerant of wave exposure being generally found in sheltered locations like fjords and sea lochs or in deeper water. Increases in wave exposure above moderately exposed would probably cause death. Adults are permanently attached to the substratum so no adult immigration is possible. No information is available about fecundity. Dispersal ability is not considered to be that great although in many locations there are nearby populations (particularly the west coast of Scotland). Reproduction occurs annually and over an extended period of time.

Decrease in wave exposure

Noise Low Very high Very Low Low

The species probably has limited facility for detection of noise vibrations. Local noise may cause the animal to close its valves.

Visual Presence Low Very high Very Low Moderate

Although the species does not have eyes or pigment spots, there is a mechanism for visual detection and a highly developed 'shadow reflex' in response to moving objects where the dorsal valve snaps shut. How this is of use in deep water with very low light levels is uncertain. On removal of the factor it may take some time for the animals to regain condition.

Abrasion & physical disturbance Intermediate High Low Moderate

Although the animal is protected by a calcified shell, it is not massively strong and physical disturbance due to a passing scallop dredge will probably cause damage and death. Adults are permanently attached to the substratum so no adult immigration to supplement the population is possible. No information is available about fecundity. Dispersal ability is not

considered to be that great although in many locations there are nearby populations (particularly the west coast of Scotland). The species may live for up to ten years. Reproduction occurs annually and over an extended period of time (Long & Stricker, 1991; James *et al.*, 1992).

Displacement	High	Moderate	Moderate	Moderate

Neocrania anomala is permanently attached to the substratum. If removed, the attachment cannot be reformed. Once detached, the brachiopod can then be moved around by water currents into unsuitable orientations or habitat and will probably cause death. Adults are permanently attached to the substratum so no adult immigration is possible. No information is available about fecundity. Dispersal ability is not considered to be that great although in many locations there are nearby populations (particularly the west coast of Scotland). Reproduction occurs annually and over an extended period of time.

Chemical Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Synthetic compound contamination				Not relevant

Insufficient information

Heavy metal contamination				Not relevant

Insufficient information

Hydrocarbon contamination				Not relevant

Insufficient information

Radionuclide contamination				Not relevant

Insufficient information

Changes in nutrient levels				Not relevant

Insufficient information

Increase in salinity	Tolerant	Not relevant	Not sensitive	High

Neocrania anomala is found in a variety of salinity conditions ranging from full down through variable and reduced to low (Connor *et al.*, 1997a.)

Decrease in salinity

Changes in oxygenation	Low	Very high	Very Low	High

Brachiopods generally have low metabolic rates with oxygen consumption being about half that of a similar sized bivalve mollusc. They can sustain anaerobic metabolism for 3-5 days. The articulate brachiopod *Terebratulina unguicula* is found in conditions where oxygen concentrations are frequently below 0.1 mg/l. At low oxygen concentrations activity may be reduced. On removal of the factor it may take some time for the animals to regain condition.

Biological Pressures

	Intolerance	Recoverability	Sensitivity	Confidence
Introduction of microbial pathogens/parasites				Not relevant

Insufficient information

Introduction of non-native species Not relevant

Insufficient information

Extraction of this species Not relevant Not relevant Not relevant Low

It is extremely unlikely that this species will be subject to targeted extraction.

Extraction of other species Tolerant Not relevant Not sensitive Low

Neocrania anomala has no known obligate relationships.

Additional information

Importance review

Policy/legislation

- no data -

Status

National (GB) importance	-	**Global red list (IUCN) category**	-

Non-native

Native	-		
Origin	-	**Date Arrived**	-

Importance information

Novocrania anomala may be a dominant component of species assemblages in which it is found. *Novocrania anomala* may be preyed upon by starfish, crustacea, gastropods and fish. The shells of brachiopods are easily drilled into, in comparison to molluscs, and the shells of *Novocrania anomala* are often heavily bored. However, predation levels are apparently low, possibly because of a low energy yield or because it is an unpalatable species.

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